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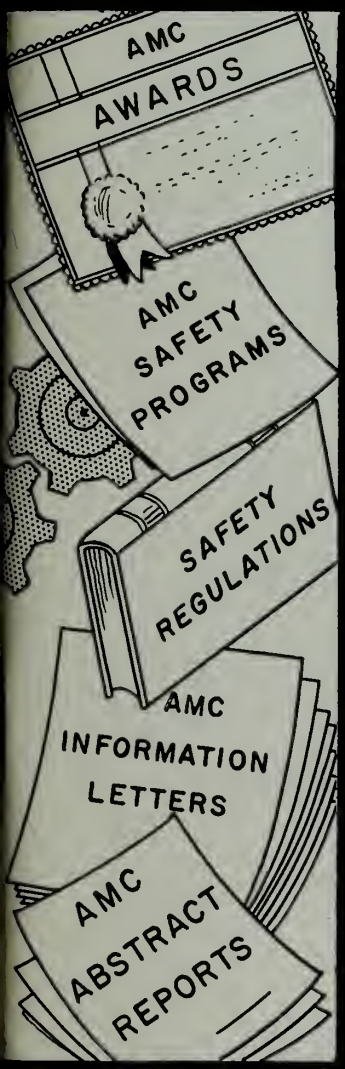
385-75

AMC PAMPHLET
AMCP 385-75

SAFETY DIGEST

JAN 1967



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UNITED STATES ARMY MATERIEL COMMAND
WASHINGTON, D.C. 20315

Outstanding Safety Performance

U. S. ARMY MATERIEL COMMAND

Fiscal Year 1966

ASST SEC OF DEFENSE CONCERNED WITH EXPLOSIVES AND FIRE INCIDENTS

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

INSTALLATIONS AND LOGISTICS

17 NOV 1965

MEMORANDUM FOR The Assistant Secretary of Army (I&L)
The Assistant Secretary of Navy (I&L)
The Assistant Secretary of Air Force (I&L)

SUBJECT: Explosive Safety

During recent weeks there has been an increase in the number of explosive incidents and fires in the plants of contractors producing explosive or pyrotechnic items. Fortunately there has not been serious loss of life or injury to personnel in the industrial complex and the majority of physical damage has been repaired without undue delay of production.

A review of these incidents by the Armed Services Explosive Safety Board has shown good safety sponsorship by the services.

However, the present production schedules have placed heavy demands on our contractors and service facilities. Production and loading lines are working on multi-shift basis. There has been an accelerated recruiting and training of personnel. This situation increases the potential hazard in our activities.

I cannot state too strongly my desire that you continue to make safety your personal business and that every effort be made to prevent unnecessary losses from fires and explosive incidents, and to continue aggressive pursuit of your safety programs to minimize these hazards.

Paul R. Ignatius

PAUL R. IGNATIUS
Assistant Secretary of Defense
(Installations and Logistics)

HEADQUARTERS
UNITED STATES ARMY MATERIEL COMMAND
WASHINGTON, D.C. 20315

AMC Pamphlet 385-75 Jan. 1967

The Safety Digest is an AMC Pamphlet prepared by the Safety Division, Headquarters, U. S. Army Materiel Command. Its purpose is to disseminate information which can materially influence and improve safety programs at all Command establishments.

Articles are included to supplement technical knowledge as well as practical knowledge gained through experience. They provide a basis for the further refinement of safety measures already incorporated in operating procedures and process layout. To achieve maximum effectiveness, the Safety Digest should be given widespread circulation at each AMC establishment.

Articles appearing in the Safety Digest are unclassified and are not copyrighted. They may be reproduced as desired in order to bring pertinent accident prevention information to the attention of all employees. The Army Materiel Command Safety Digest should be given a credit line when articles are extracted.

Unclassified material believed to be of interest or benefit to other establishments is welcome for publication in the Safety Digest. Please send articles for review to: U. S. Army Materiel Command Field Safety Agency, Charlestown, Indiana. If possible, include pictures, charts, drawings, and illustrations that clarify and heighten interest in your presentation.

(AMCAD-S)

FOR THE COMMANDER:

SELWYN D. SMITH, JR.
Major General, USA
Chief of Staff

OFFICIAL:

STANLEY J. SAWICKI
Colonel, GS
Chief, Administrative Office

Special Distribution

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AMC WINS NATIONAL SAFETY COUNCIL AWARD FOR THE FOURTH CONSECUTIVE YEAR

The National Safety Council has informed this Headquarters that the U.S. Army Materiel Command has earned a National Safety Council Award of Merit for its FY 1966 Safety Program. In 3 prior years NSC has honored AMC with Awards of Honor.

In support of this accomplishment, the following commands, installations, and activities have been approved for the listed NSC safety awards. AMC personnel are congratulated for their contributions and support of the AMC Safety Program.

◆ AWARD OF HONOR

New Cumberland Army Depot
U.S. Army Aviation Materiel Laboratories
Savanna Army Depot
U.S. Army Weapons Command
Lima Army Modification Center
Thiokol Chemical Corporation, Huntsville Division
Directorate of Procurement and Production, U.S. Army Electronics Command
Directorate of Materiel Readiness, U.S. Army Electronics Command
Watervliet Arsenal
Louisiana Army Ammunition Plant
Jefferson Proving Ground
U.S. Army General Equipment Test Activity

◆ AWARDS OF MERIT

U.S. Army Supply and Maintenance Command
Red River Army Depot
Springfield Armory
Charlotte Army Missile Plant
Harry Diamond Laboratories
Sierra Army Depot
U.S. Army Mobility Equipment Center
Letterkenny Army Depot
U.S. Army Missile Command
U.S. Army Logistics Management Center
Schenectady Army Depot
Lexington-Blue Grass Army Depot
Michigan Army Missile Plant
Rock Island Arsenal
U.S. Army Satellite Communications Agency
St. Louis Army Ammunition Plant

AWARDS OF MERIT (cont)

U.S. Army Cold Regions R-E Laboratory
Lake City Army Ammunition Plant
U.S. Army Nuclear Defense Laboratory
Longhorn Army Ammunition Plant
U.S. Army Ballistic Research Laboratories
Milan Army Ammunition Plant
U.S. Army Ammunition, Procurement and Supply Agency
U.S. Army Materials Research Agency
Twin Cities Army Ammunition Plant

* * * * *

GENERAL BUNKER PRESENTS SAFETY AWARD TO PM, SATCOM

LTG William B. Bunker, Deputy Commanding General, U.S. Army Materiel Command is shown presenting the AMC Award of Merit for Safety to COL Mitchell Goldenthal, Project Manager, SATCOM, Fort Monmouth, New Jersey. Ceremonies were held at Headquarters, AMC.

TOXICITY OF GASES IN ROCKET EXHAUST

A recent conference was held at Redstone Arsenal to consider whether, on the basis of available toxicologic information, any contraindication exists to the further development by Redstone Arsenal of NF solid rocket propellants. An additional objective of the conference was to consider what feasibly could be done to develop further toxicologic information on these propellants.

Attendees at the conference were from the Army Environmental Hygiene Agency, Headquarters, AMC, and Missile Command governmental and contractor organizations.

A summary of the discussions included the following:

1. A representative of Rohm and Haas Chemical Corporation reviewed briefly the NF propellant work done over the past several years. He pointed out that of concern now is the question of the toxic hazard of the combustion products which are known to contain substantial concentrations of HF, and he indicated that future developmental work would be influenced by the extent of this hazard. He reviewed the results of experimental work involving acute exposures of animals to HF which indicate the general magnitude of lethal concentrations as a function of the duration of exposure. A representative of USAEHA pointed out that human exposures have shown HF to have exceptionally good warning properties (irritation of eyes, nose, and skin) at concentrations well below those which would produce serious physiologic damage. Further that the irritation becomes intolerable to man before serious toxic effects occur. On this basis, there would appear to be no toxicologic contraindication to further developmental work with their propellants. The Medical Advisor, USAMC, concurred in this position.

2. With respect to what feasibly can be done to develop further toxicologic information on these propellants, the following were discussed:

a. In 1962 the Advisory Center on Toxicology, National Research Council, was requested to collect toxicologic information on the NF compounds from a variety of sources and a report was prepared by that Center. A proposal was made that the Center be requested to bring this report up-to-date. The proposal was favorably considered. Action on this will be initiated by USAEHA.

b. The feasibility of exhaust sampling during test firing of motors was discussed. A USAEHA representative pointed out this type of work is within the Agency mission. Redstone Arsenal will submit a request for this service. It was agreed that it was not possible to define the extent of any sampling program that might be established.

c. Although HF is considered to be a principal toxic component of the exhaust, it is known that there are present a variety of other components. This raised the question of the need for animal toxicologic studies. Such studies are within USAEHA mission. USAEHA representatives will present the problem to the USAEHA toxicologists for their consideration.

3. Other points covered in the discussions included the availability and limitations of respirators for protection against HF; the effects of fluorides on vegetation; the chronic effects of exposure of man to fluorides; and the NF propellants as a factor in general atmospheric pollution.

The following conclusions were reached:

1. No toxicologic contraindication exists to further development of NF propellants.

2. Updating of the toxicologic information by the Advisory Center on Toxicology, National Research Council, is indicated.

3. Redstone Arsenal will submit a request through channels for the initiation of an exhaust sampling program.

4. USAEHA will consider the possibility of carrying out toxicologic studies in which animals would be exposed to combustion products of the propellants.

END PRODUCT SAFETY FOR RECOIL MECHANISMS

Safety Office
Rock Island Arsenal

One of the tools used to help assure end product safety of recoil mechanisms is the powder gymnasticator. It is used to test various phases of performance of mechanisms manufactured at Rock Island Arsenal to be certain they function safely under any condition they may be used.

After assembly in the manufacturing area, the recoil mechanism is first put on an exerciser or mechanical gymnasticator and tested. It is then assembled to the powder gymnasticator for proof testing. This test is to discover any deficiency that may be prevalent in the material or workmanship. The test is to verify the proper functioning of the recoil and counter recoil and to assure stability of all parts under actual firing conditions.

After firing in a powder gymnasticator, a visual inspection is made of the mechanism for leaks, cracks, and loose assembled parts. The mechanism is then returned to the manufacturing area and checked for pressure retaining capabilities (nitrogen pressure leaks), cylinder scratches, cracks, and any other defects. It is then held for 5 days to assure there is no nitrogen leak before it is shipped to the contractor for assembly to the vehicle.

By performing the above tests many deficiencies have been discovered prior to shipping that could have been hazardous if the weapon should have been fired in the field. Deficiencies that have been discovered with the gymnasticator testing include cracked cradles, indicating defective material; scratched cylinders, indicating foreign material in rings or other improper assembly; and stripped threads on the counter recoil.

Advantages of performing these gymnasticating tests are:

1. Assurance is obtained that the recoil mechanism is in a safe and operational condition prior to it being fired in the field.

2. It enables any deficiency discovered to be corrected at the point of manufacture instead of necessitating returns from a distant testing area.

3. Economy of the testing phase:

a. It saves many pounds of propellant. The 175mm gun requires 55 1/2 pounds of propellant and a projectile to fire from the vehicle in field tests. The gymnasticator method requires only 23 ounces of propellant and no projectile to accomplish the same length of recoil travel of the recoil mechanism and the same pressures.

b. The expense of shipping the mechanisms to a distant testing area and returning is saved.

c. Production time is speeded up many weeks.

4. Safety of personnel is secured during tests. Besides eliminating the need for a projectile and using a greatly reduced amount of propellant charge, fewer personnel are exposed. When the 175mm gun is fired from a vehicle, 5 personnel may be required. The gymnasticator tests are accomplished with only one individual exposed and he can utilize a protective shield.

Rock Island Arsenal has three of these gymnasticators. They can be adapted to accommodate any recoil mechanism for which testing is desired.

This operation is one of the many efforts initiated at Rock Island Arsenal to assure the end product is as safe as we can produce it for personnel safety after it leaves the installation.

The photograph shows the gymnasticator adapted to firing with the M158 mount, which is used for 8-inch Howitzer and the 175mm gun.

EMPTYING ELECTROLYTE SOLUTION FROM INDUSTRIAL STORAGE BATTERIES

G. W. Lintner, Safety Officer
Rock Island Arsenal

Rock Island Arsenal has made a materials handling operation safer by adopting an employee's suggestion. The hazards that have been reduced are those which are present during the dumping and flushing of a liquid caustic potash solution from alkali storage batteries used in shop tractors, forklift trucks, and transporters. Each battery consists of up to 30 cells, each cell weighing up to 60 pounds. With a requirement of 50 batteries a year, this offers a high exposure to caustic burns and an opportunity for improper lifting.

The previous procedure was to dismantle the batteries into separate cells and manually empty the liquid caustic potash solution from each cell as shown in Photo 1. This operation had to be repeated 20 to 30 times for each battery. Because of the proximity to spills, the employee was required to wear chemical goggles, an acid apron, and gloves.

The revised method required the construction of an adjustable rack or carrier for lifting and rotating the assembled batteries. This rack fits the forks of a lift truck that is equipped with a rotating fork mechanism. After the battery is placed in the carrier, a cover with attached spout is put over the battery. The load is then tilted and the caustic solution poured into 55-gallon drums (Photo 2).

The operator is now removed from a splash burn hazard during dumping, the need to lift the cell manually is eliminated, and 8 manhours are saved per battery.

Photo 1
Before suggestion

Photo 2
After suggestion

FAILSAFE CONTROLS AND PROTECTIVE SYSTEMS

G. S. Higgins, Physicist
Nucleonics Laboratory, Sacramento Army Depot

An article entitled "Accidental X-ray Exposure" in the July 1966 issue of the Safety Digest is an account of an investigation carried out by the Atomic Energy Commission's Division of Operational Safety into an exposure to personnel. The exposure resulted from a faulty cable in which one conductor connector shorted to ground, causing the beam to remain on while personnel were working in the beam area. This article should help to point out the need for "fail-safing" of controls and protective devices, not only on X-ray units but on any hazardous equipment.

In almost every case wherein a protective device of circuit malfunction results in an accident it can be shown on an after-the-fact basis how the original design was inadequate. Many times, simple technical changes can be made to existing equipment designs to render them more desirable safety-wise.

Apparently, the only safety consideration that was built in by the manufacturer of the X-ray unit described in the article was the neon "X-ray ON" lamp. But safeguards could be applied to this particular machine to prevent recurrence of the type of accident mentioned. For example, there is no need to have even one end of the primary of the high-voltage transformer connected directly to voltage. A contractor similar to 2B could be placed at a point in the control console ahead of A3. The filament transformer (to the right in the Figure 1) must of course have power continuously even with the beam turned off. Therefore the suggested modification would necessitate the use of a four-conductor cable. Or instead, suppose a "Fault" light be placed in the console in series with the line ahead of point A3. Then should the primary of the HV transformer be energized due to any cause this light would turn on. During normal "Beam On" operation this fault light could be by-passed by a pair of contacts operated by RE1. An immediate argument of this of course is if these contacts "stick" closed after the beam is turned off the fault light is useless. However, such an argument assumes compound failure circumstances, for unless there is simultaneously both "sticking" and faulting in the unit, there is no danger. Such stuck or frozen contacts would be discovered during routine checks on protective equipment functions. The latter procedure, incidentally, should be standard with any laboratory.

The point I wish to make is that all designs, commercial, or custom, X-ray or other, have within them large potential for being made more safe.

As another example, consider the mechanism shown in Figure 2. This device was custom made and installed within our laboratory and operated successfully for 2 years. Then one day, an inherent flaw in the design was brought to our attention, purely by chance. Maintenance personnel had worked on the compressed air line system, painting them, and had turned the air pressure off. When it was turned on again the pressure was incorrectly set to 35 instead of the normal 55 psi. This low pressure was unable to move the piston of the X-ray shutter more than a half-inch. This amount was sufficient to cause the "shutter closed" light to come on even though the shutter was 90 percent open. With normal pressure applied the shutter slams up and down quite vehemently when operated, and consequently such a design flaw was not obvious. The simple solution was to use 2 switches, one located at each end of the stroke. Then should the piston ride somewhere between, both lights would be either on or off and trouble would be indicated.

In other experiences we have witnessed detection and alarm systems that have failed in service even though the equipment which they monitored had not. This can result in extremely hazardous situations in a radiation laboratory. In consequence, we have designed and installed override devices which monitor the primary warning systems themselves and sound an alarm in the event of their failure.

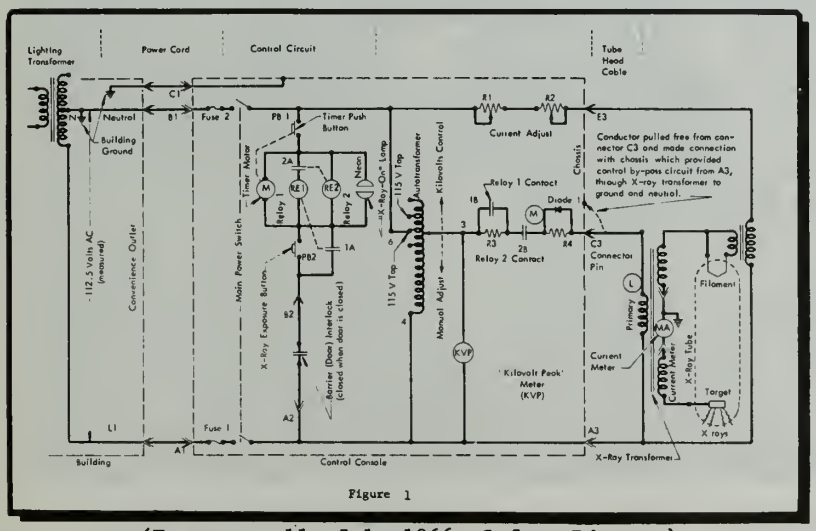
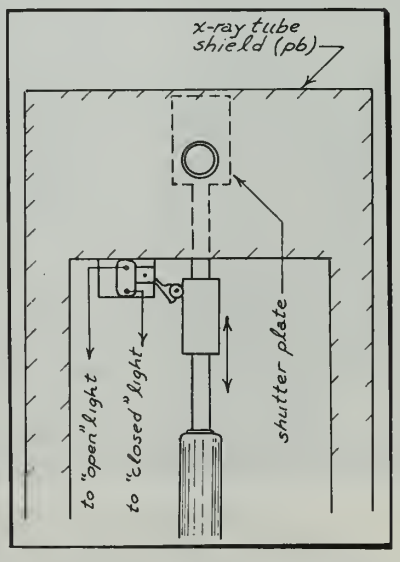


Figure 1

(From page 11, July 1966, Safety Digest.)



DEGREASING HAZARDS

John M. Knies
Industrial Hygienist, Springfield Armory

The most pleasant time to be awakened from a deep sleep is not 0400 hours. However, emergencies do not respect the basic needs of man as on the occasion when trichloroethylene vapor filled one of the buildings at Springfield Armory.

The call came from the night shift security police supervisor. One of his men on patrol detected a strong odor of trichloroethylene as he checked the door of Building 107, degreasing area. He immediately notified the supervisor, who issued instructions to bar all entrances to the area. The day shift was due to report in at 0600 hours and 2 employees were due in at 0500 hours to ignite the furnaces in the adjoining heat treating building.

On arriving at the scene, tests were taken using a Kitagawa Sampling Kit. These indicated trichloroethylene concentrations at the entrance to the building to be far in excess of 400 parts per million in the building itself. Intake and exhaust fans were installed at opposing entrances to the building and 2 maintenance employees with self-contained breathing masks were dispatched to check the tank systems. A steam valve to a heating coil of one of the 3 tanks was found partially opened. This was closed and the condenser coil valves and the exhaust were turned on. Within a half hour the levels in the building dropped to 200 parts per million. At 0545 hours levels were well below 100 parts per million and the building was opened to employees.

Subsequent investigation disclosed that the employee who was normally assigned to the degreasers was off on annual leave the day before the incident. His replacement did not receive sufficient instructions in the proper operation of the equipment.

Building 107 is adjacent to Building 103, which in turn is connected by below-grade tunnels to Buildings 101 and 111 at points approximately 50 and 200 feet from the degreasers. Readings in these tunnels were 50 to 70 parts per million at 1000 hours. This indicated that trichloroethylene vapor had settled in these areas which had been overlooked because of the concern for the immediate areas.

Although no occupational illness or injury to personnel resulted from this "accident," several valuable lessons were gleaned from this experience.

1. Inadequately trained personnel should not be permitted to operate degreasers.

2 Trichloroethylene will accumulate in pockets even in remote areas where air turbulence is not present. This is especially true in lower levels as the vapor is heavier than air.

3. If the employees had ignited the furnaces in the adjacent heat treating building, decomposition could have produced phosgene gas with serious consequences. Recent literature also indicates that an explosive situation could have resulted.

* * *

HARRY DIAMOND LABORATORIES PRESENTED AMC AWARD OF HONOR

Dr. Jay T. Thomas, Deputy for Research and Laboratories, is shown presenting the AMC Award of Honor for Safety to COL Hockmuth, Commanding Officer, HDL, and Mr. Carson, Safety Director. Mr. B. M. Horton, HDL Technical Director is shown at right.

PROPER GUARDING ELIMINATES HAZARD

D. L. Lawson, Safety Officer
Rock Island Arsenal

The control of flying chips and long lengths of sharp cuttings in the machining of metal is always a problem for safety personnel and machine operators. Manufacturers have devised various types of chip breakers and shields to eliminate this problem but occasionally a situation arises when the hazard cannot be controlled by any normal means. Such a problem arose recently at Rock Island Arsenal in the machining of a recoil piston rod for a 155mm Howitzer.

The piece being machined was 4140 steel. A 39 Rockwell carbide cutting tool was being used. The operation required 2 face cuts of one-half inch and 2 plunge cuts of approximately one inch. The material had to be turned at a fairly high rate of speed in order not to burn the cutting tool. Numerous types of chip breakers were tried but none of them would break the long strips of razor sharp metal, each about one inch wide.

The metal strips would wrap around the stock and catch on the jaws of the chuck, then break up and fly as far as 20 feet. Operators were required to wear a face shield (Photo 1) and would clear while the cut was being made. In order to stop the machine at the end of the cut, the operator was required to put himself in a dangerous position.

After several methods were tried to control the hazard, the Sheet Metal Shop of the Production Machine Tool Maintenance Section was consulted. It fabricated a guard over the chuck (Photo 2) that precluded the possibility of the jaws of the chuck grabbing the cuttings and throwing them about the adjacent area. At the beginning of the cut, the material is guided through the bed of the machine into the chip pan below.

The guard is also equipped with a sliding door (Photo 3) which allows the operator to operate the chuck without having to remove the guard from the machine each time a piece is started or finished.

Operators are now able to perform this operation without the fear of being badly cut from flying ribbons of sharp steel.

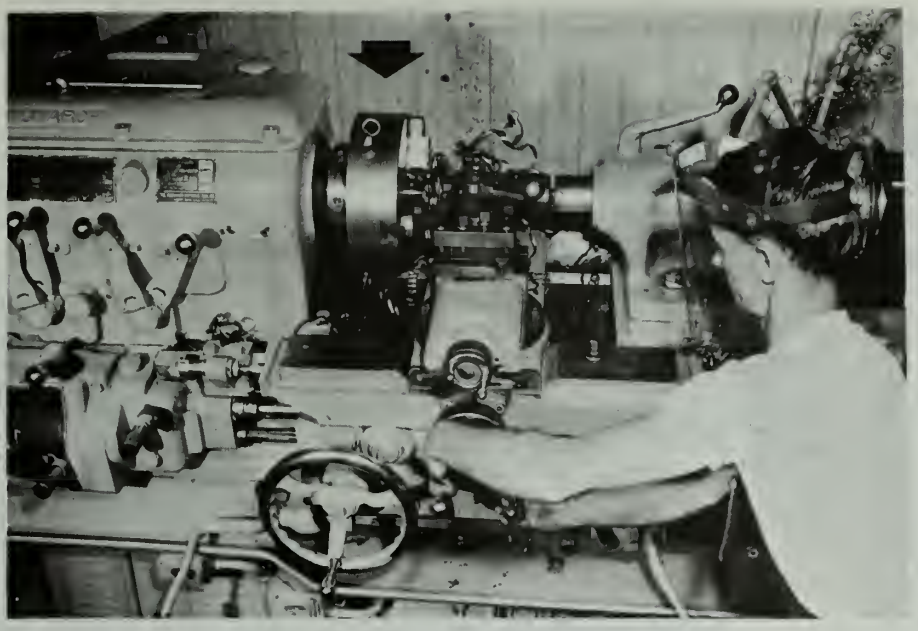


Photo 1

Before a guard was fabricated for the cutting tool, the operator was in danger of being cut by razor sharp strips of steel. Strips cut from the piece being machined could be broken off by the chuck and thrown as far as 20 feet.

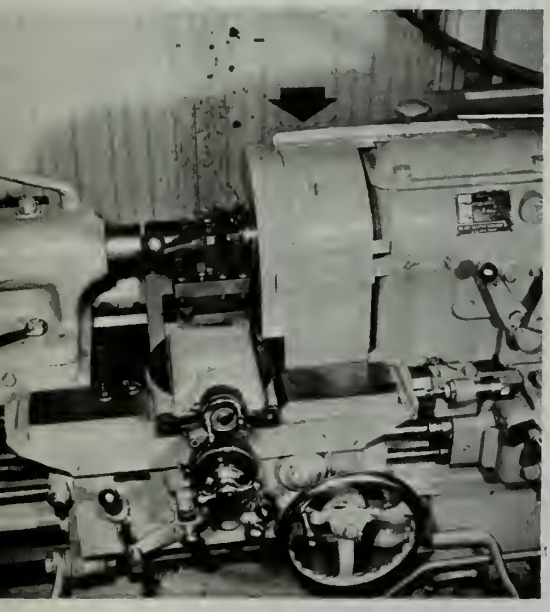


Photo 2

After a fabricated guard was installed over the chuck, the sharp strips of metal are guided safely through the bed of the machine into a chip pan below.

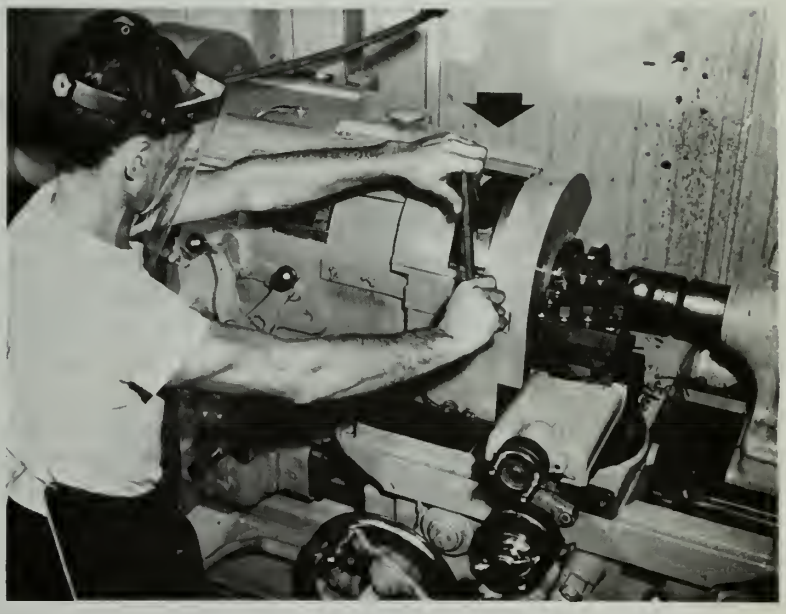
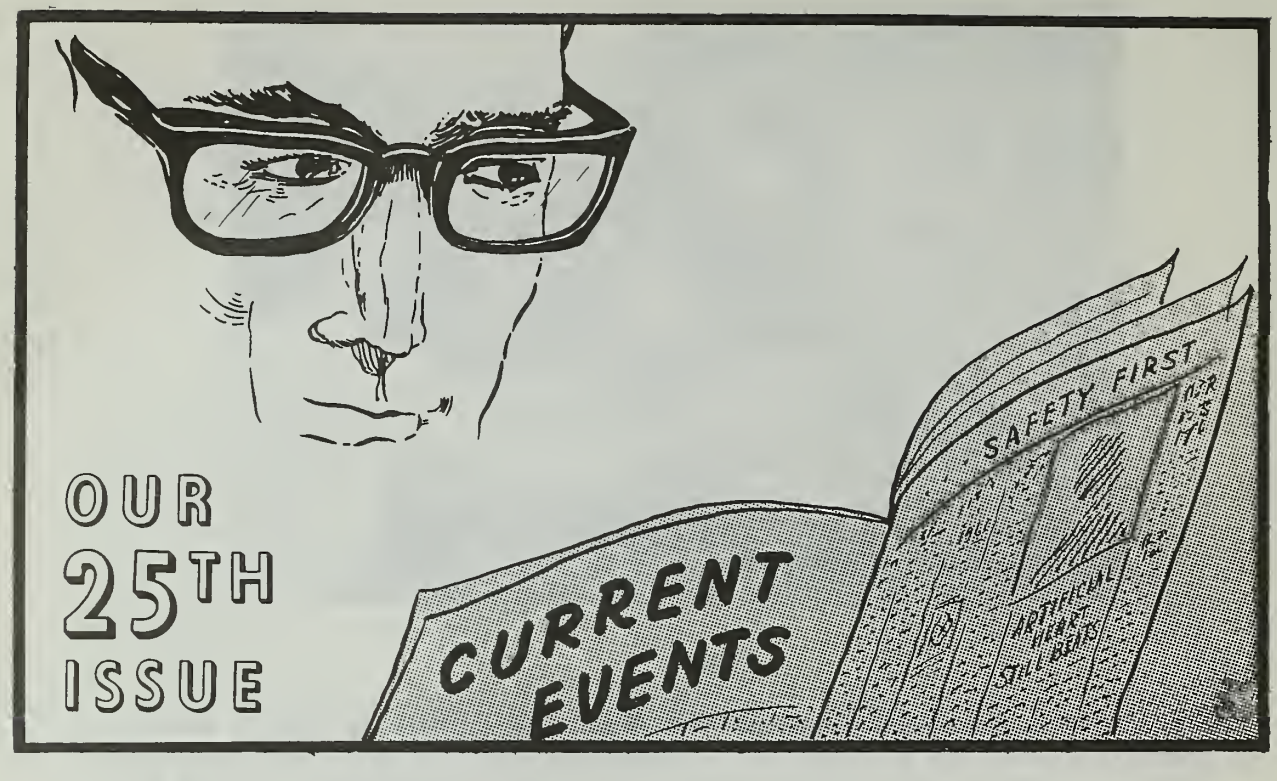


Photo 3

The guard was equipped with a sliding door to allow the operator to operate the chuck without removing the guard each time a piece is started or finished.



PATROLMAN LURKED UNSAFELY

At 2125 hours a military policeman was parked off the side of an exit road from the post bowling alley. From this position he could see stop signs and traffic at the intersection of the exit road with the street. He did not see a fireplug immediately in front of his vehicle. The weather and night visibility were good.

A passing driver failed to stop at the intersection. The military policeman started to chase the violator. He shifted into gear quickly, set his vehicle in motion, and collided solidly with the fireplug.

The driver had his seat belt properly fastened, and he was not injured by the quick stop. Damage to the Army vehicle and the fireplug was estimated to be $400.

The military policeman was counseled on safe vehicle operation. He and the other military policemen at the installation received instructions on proper parking and techniques for observing intersections.

SAFETY GLASSES SAVE EYES

Blinds were to be placed in an acid line, and a contractor employee was in the process of operating an air valve to blow out the line. He was wearing prescribed protective equipment, including a face shield and safety glasses.

The procedure required a blow point valve to be opened first and then the air valve, with about 5 pounds of pressure on the line. The worker followed this procedure. Later investigation revealed that nitric acid had apparently backed into the air line past a coupling and had eaten out part of a gasket. When the worker opened the valve about halfway, acid blew out as a spray.

The worker was standing above the valve. The acid spray blew up beneath the shield and struck his neck, face, and safety glasses. The man immediately drenched himself with water at a nearby emergency shower.

First and second degree nitric acid burns occurred wherever the acid struck his face and neck. (See Photos 1 and 2) The safety glasses protected his eyes from burns and prevented a possible loss of vision.

To prevent a similar accident, check valves were installed in blow point lines to prevent the entry of acid. Operating procedures were rewritten to emphasize correct procedure for blowing out lines. Supervision at the installation was required to review line blowing stations to insure proper installation and to make certain that check valves were operating. The accident was publicized throughout the installation on posters that showed a picture of the injured man, his statement on his experience, and a description of the occurrence.

LOCOMOTIVE - HANDCAR CHASE UPDATED

A thrilling episode of the old-time movies was the sequence in which the hero pumped a handcar madly down a railroad track in front of a speeding locomotive. Workers at an Army installation recently found themselves involved in an updated version of the old locomotive-handcar chase.

Two men on a motorized-railway maintenance car pulled out from a siding onto the installation's main line. They started down the track, moving a small train of cars loaded with work tools, supplies, and equipment. They failed to notice a locomotive pushing a boxcar behind them a quarter of a mile down the track.

The speed of the locomotive with its one car load was far greater than that of the small motorized maintenance car. The engineer was moving toward a blinding late afternoon sun. He did not expect a maintenance car to be on the track ahead of him, and he did not see it as his train bore down on it.

The men in the maintenance car became aware of the approaching train. They tried to outrun it. The train gained steadily. They tried to attract the attention of the engineer. The train came on relentlessly. A moment before the train ran down the car the 2 men made wild leaps for life.

The 2 men escaped injury. Damage to the maintenance car was estimated at $700.

After the dust had settled the safety director and the supervisors of both the railroad and the railroad maintenance operations held a meeting with all railroad operational personnel. They were instructed on their responsibilities for safe operation of trains and maintenance equipment.

PAINTERS TAKE SHORT CUT TO CEILING

Two contractor employees were painting a room at a manufacturing installation. The room had a high ceiling and a concrete floor, and it contained machinery and its piping, ventilating ducts, and fire sprinkler system pipes.

Although their ladders were available just outside the door, the painters decided it might be easier to reach parts of the ceiling without them. One man climbed upon a machine until he reached a sprinkler pipe 17 feet above the floor. He sat on one pipe and rested his feet upon a second pipe.

The duct work had not been designed to support the weight of a man. It gave way and the worker fell, upsetting the man on the sprinkler pipe as he went. They landed one upon the other on the concrete floor 17 feet below.

The noise and their cries for help brought men from an adjoining room. They found a tangle of men and duct work on the floor. The man whose weight had brought down the air duct was uninjured. The worker who had been kicked off the sprinkler pipe had landed at the bottom of the heap and he received a broken wrist.

Before the accident occurred all employees had been instructed to use ladders whenever needed and to refrain from climbing upon pipes and machinery. These instructions were repeated. Written reprimands were given to both men who were involved in the accident.

THE PHONE IS RINGING ! JUMP !

The evening was well advanced and the office was quiet. Suddenly the stillness was broken by the sound of a ringing telephone. The noisy instrument was on a desk one row in front and 2 desks down from the spot where an Army employee sat computing an inventory count. The desk was vacant.

The employee jumped up, intending to run to answer the phone. His foot landed on the edge of a wastebasket that had been left in the aisle by his desk. He stumbled and his foot went down between the railings of a chair beside the wastebasket. He fell to the floor. The combination of the awkward position and the heavy fall resulted in a multiple fracture of his right leg. It appeared that he might be disabled for 6 months.

Investigation revealed that the office area was crowded with furniture. The cleaning men appeared to have left wastebaskets scattered out of place and through the office after emptying them.

The installation's employees were cautioned not to run and to watch for obstructions in their paths. All personnel were reminded to keep wastebaskets out of aisles. Supervisors were instructed to inspect areas immediately after cleaning and to correct any hazards found.

SAFETY ENGINEERING IN EQUIPMENT DESIGN

5340-789-2646 Reel Key Chain, Chuck-key model

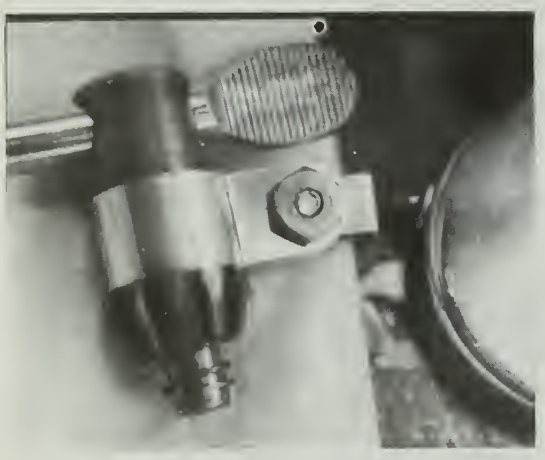


Photo 1

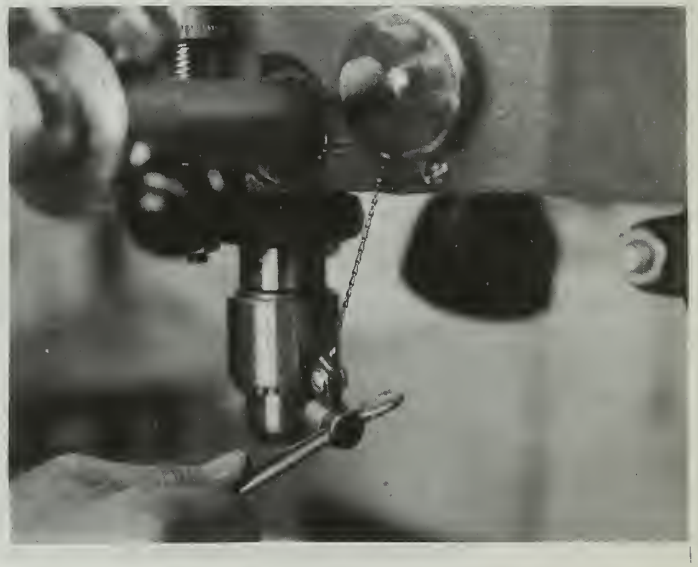


Photo 2

A "Reel Key Chain, Chuck-Key Model, FSN#5340-789-2646," at a cost of $2.15 each (snap-out drill chuck-key) is available for installation on drill presses. The spring-loaded key kicks itself out of the chuck unless held in position by hand. The key is attached to a chain which recoils into the mounted spring reel. This device is designed to prevent the key remaining in the chuck, or the key being thrown from the chuck when the drill press is energized. Human error is avoided as a potential personnel injury factor.

U.S. Army Pictorial Center

AIRCRAFT ACCIDENT PREVENTION

Preliminary findings of the AMC Aviation Safety Team currently inspecting AMC activities having aviation responsibilities indicate the following areas require improvement:

1. Some aviators are flying under instrument conditions without co-pilots contrary to Army and AMC Regulations. The AMC mission does not require deviation from these regulations except in an emergency.

2. Aviators are piloting aircraft and carrying passengers with insufficient checkouts and flying time in the particular type aircraft.

3. Aviators may be under pressure to overextend themselves to complete a mission. An aviator must evaluate his own capability under the existing conditions of weather, physical, and mental state, training, and equipment limitations before accepting a flight. In addition, once a flight has commenced this self appraisal should continue for the duration of the mission. Self appraisal and continual evaluation is a necessity inasmuch as AR 95-2 provides that the aviator in command of the aircraft is directly responsible for the technical operation and will have final authority as to technical operation of the aircraft.

4. AMC Regulations and safety letters are not reaching the aviation sections. In particular, AMC letter "Report of Major Aircraft Accident Involving U-8D," 15 Feb 1966, and AMC Regulation 385-18, 2 Aug 1966, directed that weather classes be scheduled seasonally or upon changes in weather patterns for all rated aviator personnel. These directives are still in effect, and are particularly important during the winter instrument flying months ahead.

5. Unit aviation Standard Operating Procedures (SOP's) are undated, uncontrolled, unsigned and unofficial. Local Flying Regulations, Crash Alarm System, Crash Rescue Plan, and other procedures directing compliance by personnel other than the aviation section, will be signed by the AMC installation commander; if a tenant, these regulations or procedures will be signed by the AMC activity commanding officer.

6. The portion of AR 385-40 "Accident Reporting and Records," 1 Jun 1966, concerning Aircraft Accident Investigation Boards is not being implemented locally.

7. The provisions of AMC Regulation 385-18 are not being complied with. Paragraph 6 of this regulation directed commanders to furnish one copy of current command instructions and procedures to this Headquarters, ATTN: Aviation Office (AMCAV).

ARMY LAB MAKES PROGRESS TOWARD "SAFE" AVIATION FUEL

Scientists are making major break-throughs in developing a "safe" fuel, according to an announcement from Army's Aviation Materiel Laboratories (AVLABS), Fort Eustis, Virginia.

Chemical emulsifiers have been found effective in reducing inflammable vapors which cause aircraft fires. The liquid thickening agents change the fuel's thin quality to a grease-like substance.

The fuel additive will reduce fire hazards about 91 percent, according to Francis P. McCourt, head of AVLABS' Safety and Survivability Division and discoverer of the emulsifier's effectiveness.

He said the density, rate of flow and combustibility of the "safe" fuel has had promising results in aircraft engines so far. Further environmental tests will be made to check reliability under various altitudes and temperatures.

Commanders Digest, Vol. 2, No. 58

DETRICK TESTS SOAP BUBBLES TO FIGHT FIRES

Soap bubbles have proved effective and safe in extinguishing fires in laboratories and barns, where carbon dioxide flame killers might harm animals or humans, in recent tests at Fort Detrick, Maryland.

Fort Detrick Safety Division officials knew that high detergent foam had been used in England for a number of years to combat certain types of fires, but information was lacking on how animals having a different lung capacity than man might be affected.

Sealed in a room during the Fort Detrick tests, monkeys, mice, and guinea pigs emerged from the engulfing foam with no ill effects. Safety Director, Dr. Arnold G. Wedum, said a little redness of the eyes was the only indication of reaction to the bubble bath.

Foam used in the tests was generated by a bubble machine designed on much the same principle as the child's old-fashioned bubble wand used with everyday soap. The machine quickly fills a room with fire-smothering bubbles. In less than an hour, under normal conditions, the foam evaporates into nothing--or at most into a fine granular film.

The type of detergent used for the tests is already on the market and was provided by the Mine Safety Appliances Co. of Pittsburgh. For use in laboratories it has the feature of avoiding damage to expensive equipment.

VOL 7, NO. 9, ARMY RESEARCH & DEVELOPMENT NEWSMAGAZINE, OCT '66

FIRST AID FOR CHEMICAL EYE INJURIES

Chemical burns rank first of all injuries occurring to the eye from the point of importance of immediate treatment or first aid. While almost every other type of eye injury should be sent directly to the plant medical department, chemical injuries require prompt first-aid measures at the scene of the accident. Regardless of the kind of chemical, the eye should be flushed immediately with an abundance of clear running water for at least five minutes. A delay of even a few minutes in instituting this simple procedure may result in serious loss of vision. Following copious irrigation with large amounts of water no time should be lost in getting the patient to the medical department, if such is provided, or to the nearest eye physician. Untrained persons should not attempt any further treatment than the irrigation. Ointments should not be used as they cannot be removed by the doctor and hinder his work at a later time.

The involuntary reaction of the injured person when foreign material reaches the eye is first a spasmodic closure of the eyelids, followed immediately by a tendency to rub the eye. Both of these reactions must be quickly controlled when chemicals reach the eyes. Washing the eyes with water requires that the eyelids be held open by force if necessary and no rubbing should be permitted as this may work the chemical further into the recesses of the eye. Normally, ordinary dusts or particles are removed by means of tears, but when such chemicals as acids, alkalis, corrosive salts, or organic chemicals enter the eye, their penetrating action is so fast that tears must be augmented by the use of large amounts of water to wash away the damaging material.

The presence of chemicals in the working area is a potential eye hazard for every worker. In areas of the plant where chemical eye injuries are prone to occur, all workers should be given training in how to assist fellow workers in the vital first flushing of the eyes described above. Such assistance is usually necessary because of pain and spasm of the eyelids of the injured man. In addition, facilities for washing eyes should be readily available in departments where chemicals are handled. Eye fountains designed for use at the spot are best but any source of water is satisfactory.

OCCUPATIONAL HEALTH BULLETIN, VOL. 21, NOS. 7 & 8 1966

PILE DRIVER AIDS CANNON SAFETY, SAVES DOLLARS FOR MORE GUNS

Normand J. Dault, Safety Officer
Watervliet Arsenal

Two basic elements in the design concepts of modern cannon are as old as weaponry itself. First, a weapon must have the capability of inflicting destruction on a known and evaluated enemy resource. Second, and equally important, the weapon's physical properties must also be so designed and assembled that the user will not himself be destroyed by the weapon.

This end product safety has become a critical factor in the current concepts of heavy, conventional weapons. Until a few years ago a cannon was designed with a mass that gave it, in theory at least, a life cycle that was virtually without limit. The demands of modern warfare, with emphasis on mobility, have generated a new family of cannon: generally self-propelled; light enough in weight to be air-transportable, and yet with a powerful enough punch to inflict telling damage on the enemy.

Two basic factors have brought about the successful development of this new cannon. The first was the development of steel of exceptionally high tensile strength. The other was a reduction of mass to a point where the life cycle of a cannon is predetermined and at the end of which the cannon is judged unsafe and therefore scrapped, regardless of its apparent condition and efficiency.

The problem, therefore, revolves around determining, with a high degree of reliability, the number of rounds a cannon may be fired safely, and a reliable and economical method of testing components in order to determine this life.

One method used at Watervliet Arsenal is to subject components, such as breech assemblies, to pressures equal to those generated by actual firing. This is accomplished with a modified pile driver that rams a hydraulic piston inside a gun tube butt coupled to the component.

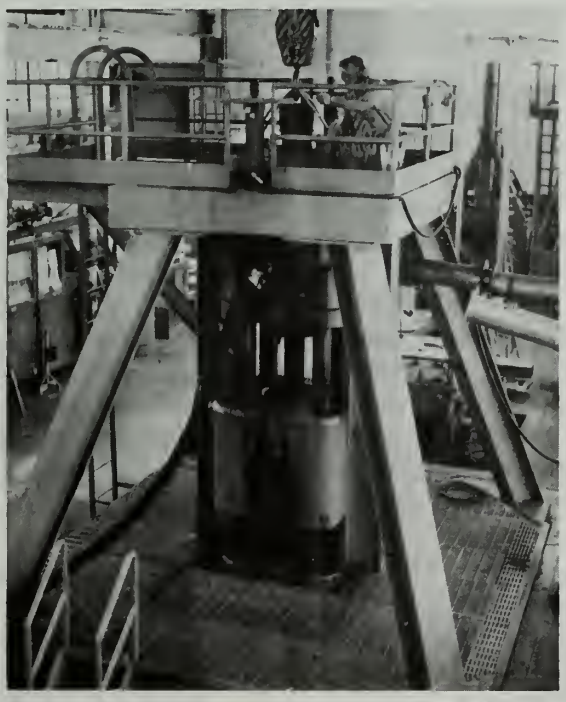
This set-up can simulate firing pressures as high as 85,000 pounds per square inch. The usual procedure is to simulate 500 firings, tear down the set-up for inspection of the component, and to repeat the cycle until the initiation of metal fatigue is detected, by magnaflux or other detection means.

This technique and others, such as hydrostatic fatigue testing, make it possible to establish fatigue limits acceptable for predetermining the safe life expectancy of cannon components. It would be impractical and virtually impossible to fire a number of component sets 30,000 to 40,000 rounds with proving ground facilities. Cost and time factors would prohibit it. Laboratory fatigue testing, dynamic and hydrostatic, also yields a volume of refined data which is beyond the range of actual firing.

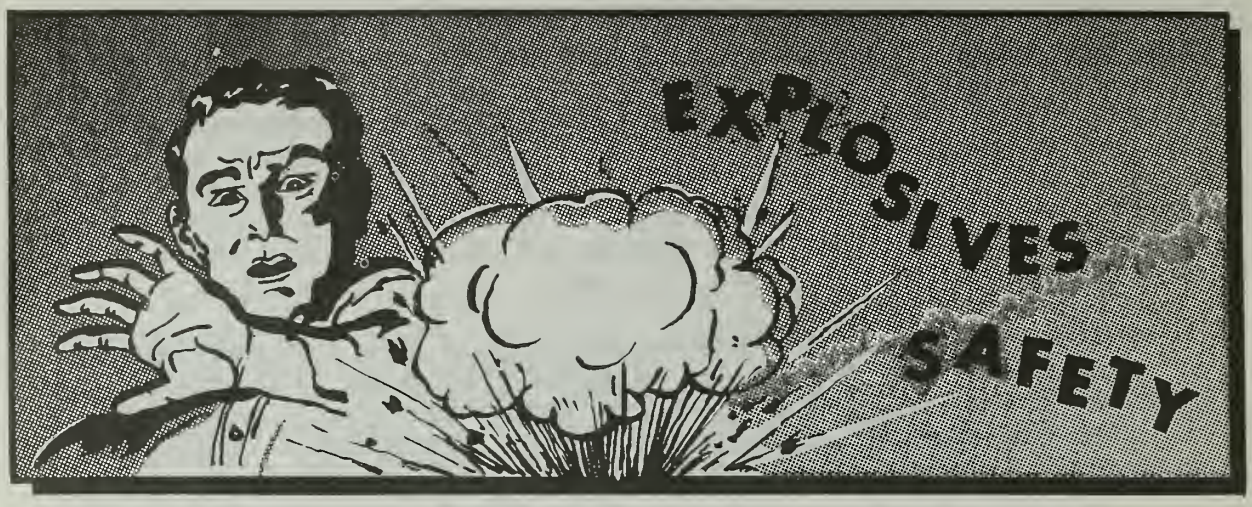
Without these laboratory techniques the fatigue limits of components would have to be established as "educated guesswork" and very conservative estimates would have to be made of the cannon life expectancies. In short, laboratory component testing means more cannon for more firings.

Through this and other test methods Watervliet Arsenal is carrying out its mission of developing heavy conventional weapons that give the American soldier a powerful punch, with safety to himself.

With its "in-house" developmental testing facilities, therefore, this installation is making unique and significant contributions to the nation's combat readiness and to the safety assurance of the weapons it places in the hands of its soldiers.



A technician makes adjustments on a 20,000-pound pile driver in experimental mechanics laboratory at Watervliet Arsenal. The hammer can raise hydraulic pressure in test breech components from a static pressure of 2,000 to as high as 85,000 pounds per square inch in 4 milliseconds.



KEEP STANDING OPERATING PROCEDURES UP TO DATE

Safety Office
Aberdeen Proving Ground

During recent years, military requirements in research and development have more and more called for operations dealing with experimental weapons, new explosives, rockets, and guided missiles, plus the association of these items with nuclear weapons. To further complicate the situation, progress in the rocket and nuclear fields has been so rapid that dissemination of information to involved personnel has lagged behind the development. In some cases, the result may have been a compromise of safety, which in turn can cause disaster.

What can we do about it? It can be summed up in one sentence: "It is imperative that a standing operating procedure be prepared for each project prior to the start of an operation." Experience has shown that adequate standing operating procedures will aid materially in the reduction of accidents. The answers to the following questions may prevent an explosives incident which could result in personnel injury or death and extensive property and/or equipment damage:

1. Are your SOP's current for the operation for which they are posted?

2. Are they prepared in sufficient detail to provide each operator with the information he needs to know to perform his duties safely?

3. Do they include such items as:

a. Personnel and explosives limits.

b. Personal protective equipment and clothing.

c. Proper tools needed to perform the work.

d. Exact equipment designation.

e. Location and sequence of operation.

4. Have they been revised to include changes based on local and AMC abstract reports of explosives accidents?

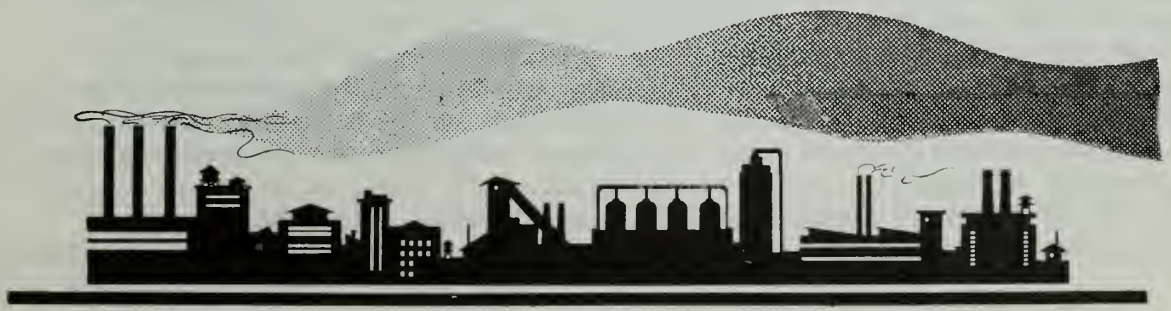
5. Are personnel thoroughly trained in performing their assignments as required by the approved SOP?

Research and development is progressing rapidly. This factor alone demands frequent review and revision of SOP's and thorough planning and operational study in the development of new SOP's. In some instances it may be necessary to conduct controlled tests in order to establish operating requirements.

Operating personnel should be fully aware of the authorized manner in which their duties are to be performed. It is the responsibility of the supervisor to train employees in the performance of their duties as outlined in the approved SOP. This means more than just telling or letting them read the SOP.

The above factors are enumerated to preclude the temptation of attempting a difficult operation as a "calculated risk" regarding safety in operation. The truth of the matter is, that when we take any kind of risk with safety, it is evident that we have not done any caluclating at all.

Compare the cost of one injury, not to mention a fatality, against the cost of a little more time and material to make the job safe.



TESTING AN OPERATIONAL SHIELD

Is there a likelihood that changing production requirements or equipment changes may create a need to test an operational shield at your installation? In the absence of reliable data, tests may be made to determine the adequacy of an operational shield that is to be used for protection of personnel against less than 15 pounds of explosives. Paragraph 2622b, AMCR 385-224, contains the basic authority and requirements for the testing. A test performed recently by Day & Zimmermann, Inc., contractor-operator of the Lone Star Army Ammunition Plant, is an example of what you may expect to do.

At Lone Star Army Ammunition Plant an operational shield was needed for an automatic loading machine operation. The operation to be shielded involved a hopper, a loading machine and M-5 propellant.

Analysis of the problem led to 2 decisions on testing procedures:

1. Determine Exposure - The exposure would be from M-5 propellant in the hopper. Since the hopper limit was 20 ounces, the test would be made with 25 ounces. This would provide a 25 percent safety factor, as required by paragraph 2622b, AMCR 385-224.

2. Ignition Sources - In actual operation friction on the machine would be the most likely source of heat that might ignite the propellant. The test would therefore be performed with M1A1 squibs rather than electric detonators, because the squibs would provide far more heat than could ever be caused by friction on the machine.

A shield was designed for the operation, and detailed drawings were prepared by Day & Zimmermann, Inc. personnel. The shield was constructed of 3/16-inch steel plate. It included a door similar to the one that would be used in actual loading operations. A hopper assembly built to the dimension of the proposed loading hopper was mounted inside the operational shield to simulate conditions in a container assembly automatic loading machine. An M1A1 squib was taped to the bottom of each hopper. (See Photo) The complete assembly was mounted on a table inside the operational shield.

The following procedures were then followed in performing the tests:

1. One end of a pair of twisted lead wires was attached to the terminals of an intermediate switch box and the other end to the operational shield being tested. The lead wires were shunted at the operational shield and the switch box placed in the "FIRE" position. The Technical Supervisor checked the switch in the protected control room and checked the entire firing circuit for continuity and extraneous electricity. When the circuit was complete and no extraneous electricity was present, the switch box was placed in the "SAFE" position, which grounded the lead wires.

2. Auxiliary lead wires approximately 10 feet long were connected to the lead wires of 2 M1A1 electric squibs and the joints were taped with electrician's tape. Terminal ends of the lead wires were twisted together. Both squibs were taped into position in the bottom of the powder hopper. The lead wires were run outside the operational shield and remained shunted until hookup with firing circuit. (Two squibs were used to guarantee ignition of the propellant.)

3. Six receptacles containing 25 ounces each of M-5 propellant were received from storage via an explosives truck. One receptacle of propellant was emptied into the hopper on top of the squib.

4. The Technical Supervisor closed the door of the shield and connected the squib leads to the lead wires from the switch box.

5. The intermediate switch box was again placed in the "FIRE" position.

6. The Technical Supervisor then returned to the control room, determined that all personnel were inside and made a final check of the entire firing circuity with the galvanometer for continuity from the control room to the operational shield. The circuit was complete. The lead wires were attached to the blasting machine and the blasting machine activated.

This test was repeated a maximum of 6 times or as determined by the results of each test shot. There was a minimum waiting period of 30 minutes between test shots.

Still photographs were made before and after all tests, and still shots and movies were made of the actual tests.

The following safety requirements were incorporated in the standing operating procedure:

1. The Technical Supervisor making the set up had the handle to the blasting machine in his possession at all times.

2. The blasting machine remained locked inside the cabinet provided until ready for use.

3. The flashing red light at the test area was on during set up and test.

4. The Technical Supervisor performing the test wore all cotton clothing and conductive soled shoes.

5. The shield to be tested was properly grounded.

6. To be doubly sure the test was adequate, the test was repeated 6 times and 2 squibs were used on each shot.

Test Results on Operational Shield

No high order detonation occurred and there was no flame leakage around the door. There was no damage whatever to the barricade or the hopper.

Conclusions

Since the hopper limit in operation would be 20 ounces of M-5 propellant and the shield satisfactorily withstood deflagration of 25 ounces, it was concluded the shield would

(Continued on bottom of next page)

AMC FY-1966 AWARD OF HONOR WON BY THIOKOL CHEMICAL CORP.
HUNTSVILLE DIVISION

Major General John G. Zierdt is shown present the AMC FY 1966 Award of Honor for Safety to General Manager John H. Goodloe during a ceremony before the Thiokol Board of Directors which was meeting at Redstone Arsenal. Third from the left is Mr. J. W. Crosby, Chairman of the Board, and to his right is Mr. Jack Harbarger, Safety Director, Thiokol Chemcial Corporation, Huntsville Division. Through 19 October 1966, the Division has established a record of 7,560,000 manhours, and 1,351 days without a disabling injury.

SAVANNA ARMY DEPOT PRESENTED AMC FY 1966 AWARD OF MERIT

COL E. L. Snapp, Special Assistant to the Deputy Commanding General, AMC, is shown presenting the AMC Award of Merit to COL B. B. Abrams, Commander of Savanna Army Depot. This second highest AMC safety award was received for the Depot's outstanding safety record during FY 1966.

Continued from preceeding page

be safe for use. The technical report contained a recommendation that the shield be installed for use on the automatic loading machine.

Copies of the technical report and drawings were forwarded through channels as required by paragraph 2622b, AMCR 385-224.

ECOM SAFETY EXHIBIT

"Stop accidents, stay alive, drive safely;" the theme of the ECOM traffic safety campaign is viewed by COL Charles T. Clark, Director of Installations and Services; Bernard M. Savaiko (right), U.S. Army Electronics Command Safety Director; and Joseph Smith, Chief, Exhibits Branch, A movie on seat belt safety, entitled "Broken Glass" is continuously shown in the center panel of the exhibit. The blinking lights at the base of the display states: Courtesy + Caution+ + Control = Safety. Appropriate safety pamphlets, litter bags, bumper stickers, etc., are provided at the display for all personnel to pick up. The safety exhibit display is mobile and is rotated periodically through all activities and cafeterias at Fort Monmouth in a further effort to reduce traffic fatalities, accidents, and violations.

A different theme was developed by ECOM for the display board for Armed Forces Day. Safety glasses, masks, shoes, and devices were shown.

A SAFETY ARTICLE REFERENCE INDEX

The following list of the more interesting articles published since November 1962 in the Safety Digest is included for your convenience in making reference to them. The titles are grouped under general subject headings.

Explosives Safety

Plan Complete Explosives Safety, November 1962

Deadly Rejects, January 1963

Engineering for Safety, January 1963

Concurrent Operations, March 1963

Evaluation of Safety in Testing Artillery, Mortar, and Recoilless Rifle Ammunition, May 1963

Lead Azide, July 1963

Growth of Composition B, July 1963

New Safety Guide on Ammonium Nitrate Fuel Oil Blasting Agents, July 1963.

SMC Reports Some Explosives Discrepancies, September 1963

Special Equipment for Propellant Development, November 1963

Safety Standards for Explosives Operations, November 1963

Propellant + Heat, November 1963

Cleaning Propellant Casting Cans, November 1963

Igniter Handling and Storage Tray, January 1964

Misfire Remover for Mortars, March 1964

Special Equipment for Propellant Transfer, May 1964

Improved Primer Storage, May 1964

Explosives Safety (Cont)

Testing of Hoppers Used in Loading Separation Charge Assembly for the XM536 Fuze, July 1964

What Color is Solid Propellant?, July 1964

Destructive Force of Primer Demonstrated, July 1964

Aluminum Paint Hazard, November 1964

Accidental Ignition During Burn-Out, November 1964

Laboratory Oven Safety, January 1965

Maintenance Operations and Explosives Hazards, January 1965

Cushioning Strip Machine, March 1965

Testing to Assure Protection, May 1965

Rough Handling Does Cause Explosions, May 1965

Extraneous Electricity is Constant Explosives Hazard, July 1965

In-Wall Storage of Explosives, July 1965

Maintenance of Explosives Contaminated Equipment, July 1965

Designing Safe Explosives Processing Equipment, September 1965

Prevent Accidental Initiation of Electro-Explosives Devices, September 1965

Spark of Disaster, November 1965

Hazard Classification Tests of Ammunition, Blank, for 105mm Howitzer, November 1965

The Hazards of Amateur Rocketry, January 1966

New Frictionless Loader Breakthrough in Loading Initiating Explosives, March 1966

Explosion During Dispenser Loading, March 1966

Remote Control Explosives Machining at Picatinny Arsenal, May 1966

Explosives Safety (Cont)

Are Your Tests Up to Date?, May 1966

Safety Locked Into Test Facility, July 1966

Safe Practices in Propellant Surveillance, July 1966

Proper Respect for Hazardous Material, September 1966

Pilot Shielding for Helicopter Rocket Tests, September 1966

Measuring Blade Clearances in Vertical Planetary Propellant Mixers, September 1966

Industrial Safety

Harmful Effects of Noise, January 1963

Lift Trucks, May 1963

Safeguards Against Electrical Shock, January 1964

Grinding Wheels, March 1964

Repair it With Fiberglass, March 1964

Materials Handling Safety Training, July 1964

Safe Operation of Mobile Aerial Towers, September 1964

Industrial Vision, September 1964

Aerosol Cans - Handle With Care, September 1964

Safe Disposal of Aerosol Cans, September 1964

Industrial X-Ray Safety at Watervliet Arsenal, November 1964

Safe Lifting Device, November 1964

Aluminum Paint Hazard, November 1964

Breathing Equipment Fits Job Needs, November 1964

Planning to Save Human Hands, November 1964

Industrial Safety (Cont)

Near Tragedy When Chemox Respirator is Misused, January 1965

Safe Maintenance and Inspection of Tanks, January 1965

A Safe Fire Hose Testing Method, March 1965

Planning Produces Shop Safety, March 1965

Box Eliminates Scalding Hazard, March 1965

Movable Shields Protect Gas Cylinders, March 1965

Thermal Underwear Can Be Dangerous, March 1965

Protective Device for Power Mowers, March 1965

Battery Booster Procedure, May 1965

Curtain Makes Incinerator Safer, November 1965

Safe Machines for Accident Free Operation, January 1966

Hydraulic Jack Lift and Tailgate System, July 1966

Safety Programming and Management

Safety Program in the U.S. Army Technical Escort Unit, May 1963

End Product Safety, July 1963

The Importance of Coordination in Industrial Medical and Safety Programs, September 1963

Safety Through TV, January 1964

U.S. Army Materiel Command Field Safety Agency Institute of Technical Information, March 1964

The AMC Safety Equipment Exhibit, March 1964

Materials Handling Safety Training, July 1964

Safety Programming and Management (Cont)

Planning Produces Shop Safety, March 1965

Statements by the President, Mission "Safety-70," Memorandum for the Heads of Executive Departments and Agencies, May 1965

Highway Safety Action Program, May 1965

Program for Perfection, Zero Accidents - Zero Defects, May 1965

Motion Draws Eye to Safety Message, May 1965

Potent Methods to Reduce Industrial Accidents, September 1965

Professionalism, January 1966

Picatinny Safety Personnel Plan Civilian Defense, January 1966

The Manager's Role in Safety, March 1966

Do Your Standing Operating Procedures Supply the Answers?, March 1966

Fire Safety Program Elements, May 1966

Make Your Posters Work Harder for Safety, July 1966

Plan for Parking Lot Safety, July 1966

Hercules Safety Theater, July 1966

Laser Safety

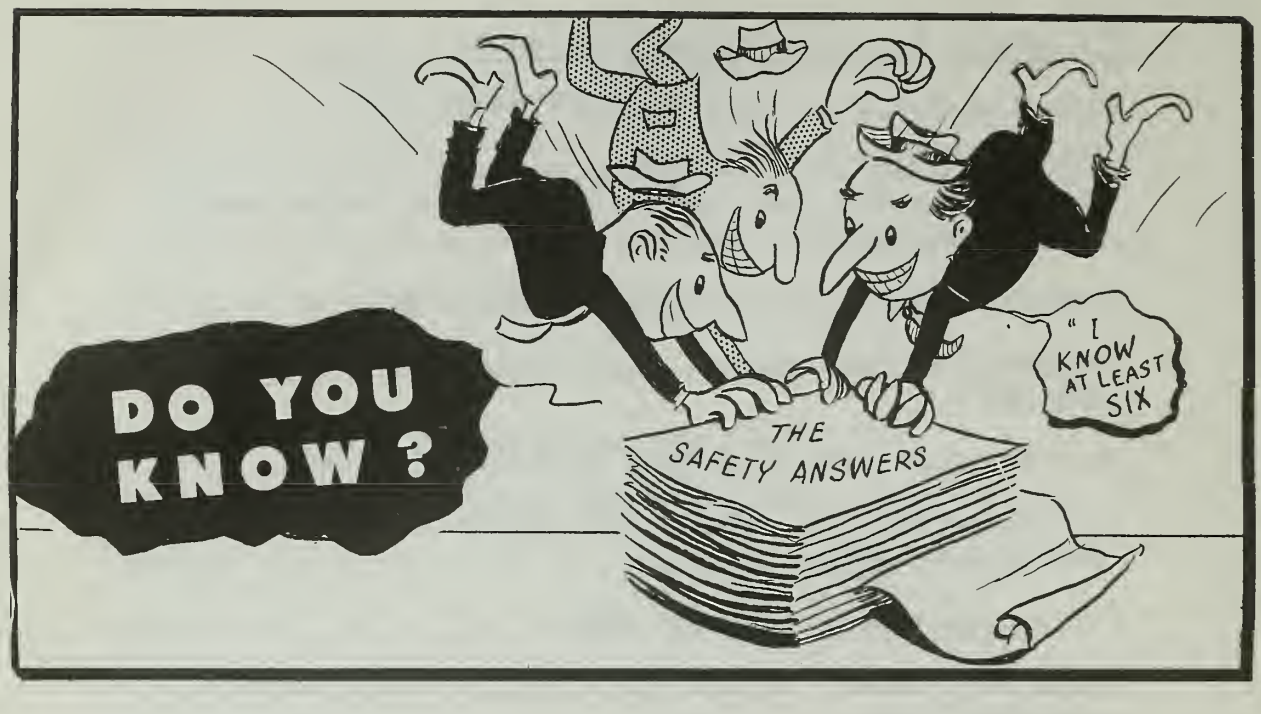
Lasers Introduce New Safety Problems, January 1964

Accidental Laser Exposure, January 1964

General Safety Guide for Laser Users, March 1965

Safety Considerations for Lasers, September 1966

This index will be continued in the March 1967 issue, AMCP 385-76.



The following questions on safety will test your ready knowledge of 10 subjects covered by AMCR 385-224. How many can you answer? Try them before turning to the answers on pages 39 and 40.

1. What should the maximum pressure be for steam used in the heating of operating buildings containing explosives?

Answer and reference:

2. Who should be required to supervise any approved chemical destruction of explosives?

Answer and reference:

3. What is the maximum quantity of Class 7 materials which may be placed on one loading dock?

Answer and reference:

4. Can JATOS be sand or shot blasted?

Answer and reference:

5. How many electric heat sealing machines should be placed within one operating room, bay, or cubicle?

Answer and reference:

6. Under what circumstances shall repairs be made to the interior of magazines containing bulk explosives?

Answer and reference:

7. What objects may be used in making static grounds?

Answer and reference:

8. What type of magazine may be used for the storage of all items of ammunition or explosives?

Answer and reference:

9. What guides should be used by AMC installations to govern any phase of fire protection not covered by AMCR 385-224 or other current Army directives?

Answer and reference:

10. Are red lights permitted on the front of vehicles transporting explosives and ammunition on public roads or within AMC installations?

Answer and reference:

BY THE WAY

Do you know something about safety that should be brought to the attention of other safety personnel? Have you used a different approach that has been effective in solving a common problem? Has an adopted suggestion made an operation safer? Does a recent occurrence at your installation teach a lesson that might be useful for other installations? Do you know or have you recently learned something about safety you would like to share?

If you answer "Yes" to any of these questions, you have something to say that may interest Safety Digest readers. It should be put on paper and mailed, with pictures if these will make the information clearer. Please include your name, title, and your installation's name on the article.

Your contribution to the Safety Digest can bring you the satisfaction of helping other safety personnel and earning recognition for your efforts.

Send your item to:

U.S. Army Materiel Command Field Safety Agency
Charlestown, Indiana 47111

REFERENCE PUBLICATIONS

AR 55-45, 7 September 1966
Transportation and Travel - Military Standard Transportation and Movement Procedures (Milstamp) Responsibilities

AR 95-2, Change 4, 11 October 1966
Aviation - Flight Regulations for Army Aircraft

AR 385-55, Change 1, 31 October 1966
Safety -Prevention of Motor Vehicle Accidents

AR 750-25, 11 October 1966
Maintenance of Supplies and Equipment - Army Metrology and Calibration System

AR 750-32, 31 October 1966
Maintenance of Supplies and Equipment - Air Delivery, Parachute Recovery, and Aircraft Personnel Ejection Systems

AR 755-15, 4 November 1966
Disposal of Supplies and Equipment - Disposal of Unwanted Radioactive Material

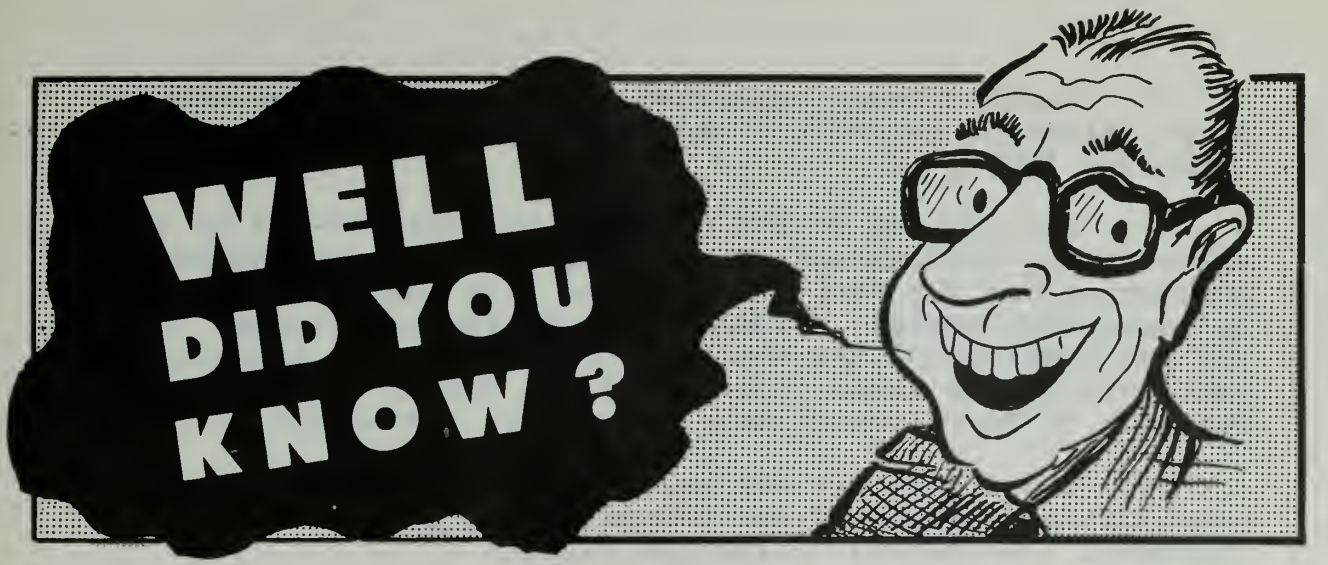
AMCR 50-1, 16 September 1966
Nuclear Weapons Surety Program - Nuclear Weapon Accident and Incident Control (NAIC)

AMCR 350-7, 12 September 1966
Education and Training - Military Training Policies and Procedures

AMCR 385-2, 28 September 1966
Safety - Accident Reporting - Routing of Required Reports

AMCR 385-15, 6 September 1966
Safety - Policy and Procedures for Implementation of Peacetime Safety Rules for Nuclear Weapons

AMCR 385-19, 4 November 1966
Safety - AMC Chemical and Biological Weapons Safety Committee



Answers are given below for the questions that appear on pages 36 and 37. If you answer all of them correctly, you may mark your answer sheet "excellent." All questions were based on information contained in AMCR 385-224. A reference to the pertinent paragraph follows each answer.

1. A maximum steam pressure of 5 psi (228°F.) may be used in heating buildings that contain explosives. Reference: Paragraph 523.

2. Chemical methods of destruction of explosives must be supervised by qualified personnel having knowledge of chemistry. Reference: Paragraph 302.

3. Provided all pertinent explosives quantity-distance separations are complied with, the maximum quantity of Class 7 material permitted at one loading dock shall not exceed 250,000 pounds. Reference: Paragraph 1717b as amended by Change 12.

4. Sand and shot blasting of JATOS is prohibited. Reference: Paragraph 2509a.

5. One machine per operating room, bay, or cubicle is the limit for heat sealing equipment. Reference: Paragraph 2623.

6. Under no circumstances shall repairs be made to the interior of magazines containing bulk explosives. Reference: Paragraph 1813a.

7. Static grounds can be made to water pipes, ground cones, buried copper plates, or driven ground rods, which may or may not be part of the lightning protection system or to down conductors of lightning protection systems. Reference: Paragraph 702.

8. Earth-covered magazines may be used for the storage of all items of ammunition and explosives. Reference: Paragraph 1802a.

9. If guidance is not provided by AMCR 385-224 or other current Army directives, the mandatory provisions and advisory suggestions of the National Board of Fire Underwriters should be where they apply. Guidance should also be obtained from the publications of the National Fire Protection Association -- particularly the latest edition of the Crosby-Fiske-Forster Handbook of Fire Protection. Reference: Paragraph 1203b.

10. Red lights are not permitted on the front of vehicles transporting explosives and ammunition on public roads and highways. Reference: Paragraph 2205e.

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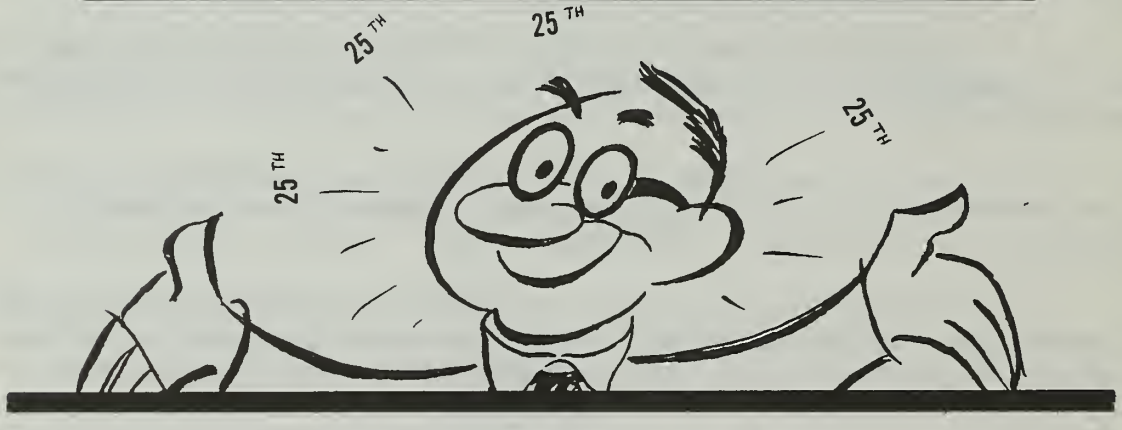
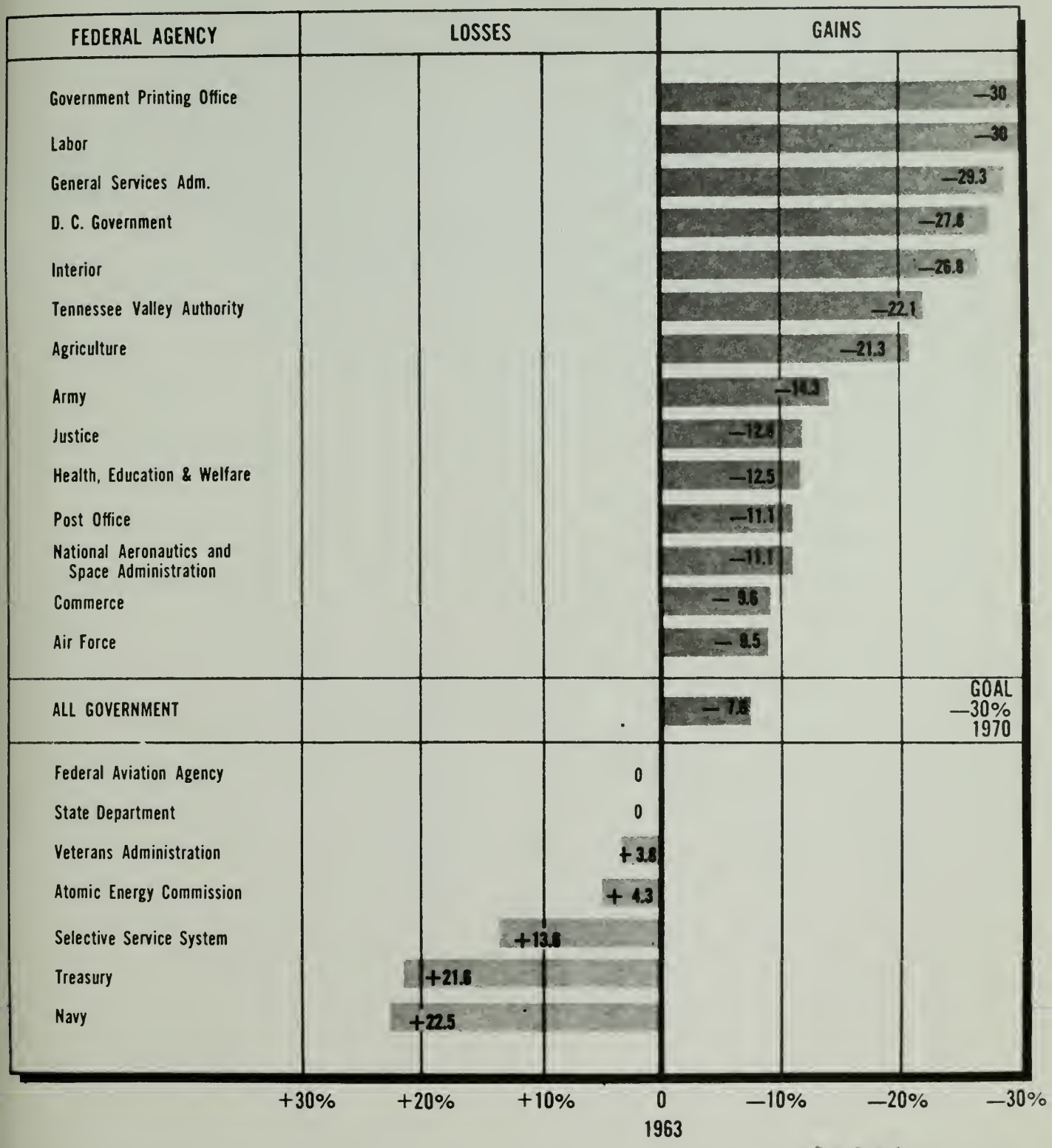


Editor, AMC Safety Digest

This is the 25th edition of the AMC Safety Digest. During the past 4 years your contributions have helped to increase safety at other commands, installations, and activities. By-lines are appropriately credited.

Not so well known are the contributors in assembling, graphics, and photographs. For instance, Charles Martin and his staff at FSA have the job of reviewing, editing, and assembling material which is forwarded to HQ, AMC. Covers, headings, graphics, and putting the Safety Digest into shape for printing was first the job of Bert Adkins, Chief, and at present, George Kehl of the Graphics Division, Administrative Office, AMC. John Lewin of the AMC Photo Lab provides photographic assistance, and Saundra Oliva furnishes photographs from her files. Review assistance by other members of AMC Headquarters is gratefully acknowledged.

1965 PROGRESS TOWARD MISSION SAFETY-70 GOAL *



* *Percent change in BEC injury frequency rates 1965 over 1963 base year.*

Federal Safety Council
October 1966

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